

**In the Claims:****Claim 1 (currently amended):**

- 1 1. A method for making a series of nanoscale microstructures comprising the steps of:
- 2 (1) forming a chiral block copolymer containing a plurality of first polymer blocks of
- 3 first polymers and a plurality of second polymer blocks of second polymers, wherein
- 4 at least said first polymer blocks are chiral polymer blocks exhibiting chirality, and
- 5 said first and second polymer blocks are capable of being subject to a micro-phase
- 6 separation and said first polymer blocks have a volume fraction ranging from 10 to
- 7 90%;
- 8 (2) causing a microphase separation in said chiral block copolymer;
- 9 wherein said first polymer is poly(L-lactide) and said second polymer is selected from the
- 10 group consisting of polystyrene and pol(4-vinylpyridine), further wherein said chiral block
- 11 copolymer is poly(styrene)-poly(L-lactide) (PS-PLLA) chiral block copolymer when said
- 12 second polymer is polystyrene and poly(4-vinylpyridine)-poly(L-lactide) (P4VP-PLLA)
- 13 chiral block copolymer when said second polymer is pol(4-vinylpyridine).

**Claim 2 (original):**

- 1 2. The method for making a series of nanoscale microstructures according to claim 1, wherein
- 2 said chiral block copolymer is poly(styrene)-poly(L-lactide) (PS-PLLA) chiral block
- 3 copolymer, said first polymer is poly(L-lactide), and said second polymer is polystyrene.

**Claim 3 (original):**

- 1 3. The method for making a series of nanoscale microstructures according to claim 1, wherein
- 2 said chiral block copolymer is poly(4-vinylpyridine)-poly(L-lactide) (P4VP-PLLA) chiral
- 3 block copolymer, said first polymer is poly(L-lactide), and said second polymer is pol(4-

4 vinylpyridine).

Claim 4 (currently amended):

1 4. The method for making a series of nanoscale microstructures according to claim 1, wherein  
2 said ~~poly(L-lactide)~~ has first polymer blocks have a volume fraction ranging from about 20%  
3 to about 49%.

Claim 5 (original):

1 5. The method for making a series of nanoscale microstructures according to claim 1, wherein  
2 said nanoscale microstructures are a series of helical microstructures.

Claim 6 (original):

1 6. The method for making a series of nanoscale microstructures according to claim 1, wherein  
2 said nanoscale microstructures are a series of cylindrical microstructures each with a  
3 hexagonal crossection.

Claim 7 (currently amended):

1 7. The method for making a series of nanoscale microstructures according to claim 2 1, wherein  
2 said poly(styrene)-poly(L-lactide) (PS-PLLA) chiral block copolymer is prepared using a  
3 polymerization process comprising the following steps:

4 (1) mixing styrene with BPO and 4-OH-TEMPO to form 4-hydroxy-TEMPO-terminated  
5 polystyrene; and

6 (2) mixing said 4-hydroxy-TEMPO-terminated polystyrene with  $\{(\eta^5\text{-EDBP})\text{Li}_2\}[(\eta^5\text{-}$   
7  $\text{Bu})\text{Li}(0.5\text{Et}_2\text{O})]_2$  and L-lactide in an organic solvent to form said poly(styrene)-  
8 poly(L-lactide) chiral block copolymer.

Claim 8 (original):

- 1 8. The method for making a series of nanoscale microstructures according to claim 7, wherein  
2 said polymerization process is a living polymerization in which monomers are sequentially  
3 added to a polymerization mixture.

Claim 9 (currently amended):

- 1 9. The method for making a series of nanoscale microstructures according to claim 1, wherein  
2 said phase separation of said ~~poly(styrene)-poly(L-lactide)~~ chiral block copolymer is  
3 achieved through crystallization.

Claim 10 (currently amended):

- 1 10. An object containing a series of repeating nanoscale microstructures formed in a substrate,  
2 said object being formed using a process comprising the steps of:

- 3 (1) forming a chiral block copolymer containing a plurality of first polymer blocks of  
4 first polymers and a plurality of second polymer blocks of second polymers, wherein  
5 at least said first polymer blocks are chiral polymer blocks exhibiting chirality, and  
6 said first and second polymer blocks are capable of being subject to a micro-phase  
7 separation and said first polymer blocks have a volume fraction ranging from 10 to  
8 90%;

- 9 (2) causing a microphase separation in said chiral block copolymer;

10 wherein said first polymer is poly(L-lactide) and said second polymer is selected from the  
11 group consisting of polystyrene and pol(4-vinylpyridine), further wherein said chiral block  
12 copolymer is poly(styrene)-poly(L-lactide) (PS-PLLA) chiral block copolymer when said  
13 second polymer is polystyrene and poly(4-vinylpyridine)-poly(L-lactide) (P4VP-PLLA)  
14 chiral block copolymer when said second polymer is pol(4-vinylpyridine).

Claim 11 (currently amended):

- 1 11. The method for making a series of nanoscale microstructures object according to claim ~~11~~  
2 10, wherein said block copolymer is a poly(styrene)-poly(L-lactide) chiral block copolymer,  
3 and said first polymer blocks are poly(L-lactide) blocks and said second polymer blocks are  
4 polystyrene blocks.

Claim 12 (currently amended):

- 1 12. The method for making a series of nanoscale microstructures object according to claim ~~11~~,  
2 10 wherein said block copolymer is a poly(4-vinylpyridine)-poly(L-lactide) chiral block  
3 copolymer, and said first polymer blocks are poly(L-lactide) blocks and said second polymer  
4 blocks are poly(4-vinylpyridine) blocks.

Claim 13 (currently amended):

- 1 13. The method for making a series of nanoscale microstructures object according to claim ~~9~~, 10  
2 wherein said ~~poly(L-lactide)~~ has first polymer blocks have a volume fraction ranging from  
3 about 20% to about 49%.

Claim 14 (currently amended):

- 1 14. The method for making a series of nanoscale microstructures object according to claim ~~11~~,  
2 10 wherein said nanoscale microstructures are a series of helical microstructures.

Claim 15 (currently amended):

- 1 15. The method for making a series of nanoscale microstructures object according to claim ~~11~~,  
2 10 wherein said nanoscale microstructures are a series of cylindrical microstructures each  
3 with a hexagonal crossection.

Claim 16 (currently amended):

- 1 16. The method for making a series of nanoscale microstructures object according to claim ~~12~~  
2 10, wherein said poly(styrene)-poly(L-lactide) (PS-PLLA) chiral block copolymer is prepared  
3 using a polymerization process comprising the following steps:

- 4 (1) mixing styrene with BPO and 4-OH-TEMPO to form 4-hydroxy-TEMPO-terminated  
5 polystyrene; and
- 6 (2) mixing said 4-hydroxy-TEMPO-terminated polystyrene with  $\{(\eta^5\text{-FDBP})\text{Li}_2\}[\text{Cp}^*\text{-}$   
7  $\text{Bu})\text{Li}(0.5\text{Et}_2\text{O})\}_2$  and L-lactide in an organic solvent to form said poly(styrene)-  
8 poly(L-lactide) chiral block copolymer.

Claim 17 (currently amended):

- 1 17. The method for making a series of nanoscale microstructures object according to claim ~~17~~,  
2 16 wherein said polymerization process is a living polymerization in which monomers are  
3 sequentially added to a polymerization mixture.

Claim 18 (currently amended):

- 1 18. The method for making a series of nanoscale microstructures object according to claim ~~12~~,  
2 10 wherein said phase separation of said poly(styrene)-poly(L-lactide) chiral block  
3 copolymer is achieved through crystallization.

Claim 19 (canceled):

- 1 19. A nanoscale process comprising the steps of:
- 2 (1) obtaining an object, said object contains a series of nanoscale microstructures;
- 3 (2) wherein said nanoscale microstructures are formed using a process containing the  
4 following steps:
- 5
- 6 (A) forming a block copolymer containing a plurality of first polymer blocks and  
7 a plurality of second polymer blocks, wherein said first polymer blocks are  
8 chiral blocks, wherein said first polymer blocks have a volume fraction  
9 ranging from 20 to 49%;

10 (B) causing a phase separation in said block copolymer.

Claim 20 (canceled):

1 20. The nanoscale process according to claim 19, wherein said block copolymer is a  
2 poly(styrene)-poly(L-lactide) chiral block copolymer, and said first polymer blocks are  
3 poly(L-lactide) blocks and said second polymer blocks are polystyrene blocks.

Claim 21 (new):

1 21. A method for making a series of nanoscale microstructures comprising the steps of:

2 (1) forming a chiral block copolymer containing a plurality of first polymer blocks of  
3 first polymers and a plurality of second polymer blocks of second polymers, wherein  
4 at least said first polymer blocks are chiral polymer blocks exhibiting chirality, and  
5 said first and second polymer blocks are capable of being subject to a micro-phase  
6 separation and said first polymer blocks have a volume fraction ranging from 10 to  
7 90%;

8 (2) causing a microphase separation in said chiral block copolymer to self-assemble into  
9 a series of nanohelical microstructures.

Claim 22 (new):

1 22. A method for making a series of nanoscale microstructures as claimed in Claim 22 wherein  
2 said first polymer is poly(L-lactide).